

Claims:

1. An apparatus for heat exchange, in particular for use in motor vehicles and especially for use in motor vehicle air-conditioning systems which have a fluid as refrigerant,
at least one feed line and discharge line (1, 2) in order to introduce the fluid into the apparatus and to remove the fluid from the apparatus;
at least two heat exchanger units, each of these heat exchanger units
having at least one distribution space or one collection space (4a, 5a, 4b, 5b) and
at least one throughflow device (7), with it being possible for the fluid to flow between the at least two distribution or collection spaces (4a, 5a, 4b, 5b) through the throughflow device (7), and
at least one separating device (13a) which divides at least one distribution or collection space into two subspaces,
at least one flow connection device (13) which connects the heat exchanger units to one another in such a manner that the refrigerant can flow between the heat exchanger units, with the flow cross sections upstream and downstream of the flow connection device assuming a predetermined ratio to one another.
2. The apparatus for heat exchange, in particular as claimed in claim 1, characterized in that the throughflow device (7) has at least one first end-side flow connection section (23), through which the refrigerant enters the throughflow device (7) or leaves the throughflow device (7), and a second end-side flow connection section (23'), through which the refrigerant leaves the throughflow device (7) or enters the throughflow device (7), and in that the first flow connection section (23) and the second flow connection

section (23') are flow-connected to each other by at least one tube section (26).

- 5 3. The apparatus for heat exchange, in particular as claimed in claim 1, characterized in that the tube section (26) has at least one straight section.
- 10 4. The apparatus for heat exchange, in particular as claimed in claim 1, characterized in that the tube section (26) has at least one curved section.
- 15 5. The apparatus for heat exchange, in particular as claimed in one of the preceding claims, characterized in that at least one flow connection section (23, 23') has a twisted section.
- 20 6. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the throughflow device has at least one flow passage (27), preferably a plurality of flow passages, for passing on the refrigerant.
- 25 7. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that a plurality of throughflow devices (7) are provided and devices for heat exchange, such as, for example, cooling ribs (10), are provided between these throughflow devices (7).
- 30 8. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the throughflow device (7) has a cross section in the form of a flat tube.
- 35 9. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the heat exchanger units are

preferably connected in pairs by flow connection devices (13).

- 5 10. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the number of heat exchanger units is n and the number of flow connection devices is $n-1$.
- 10 11. The apparatus for heat exchange, characterized in that a plurality of separating devices (13a, 13b) are provided, which divide the distribution or collection spaces into a plurality of subspaces.
- 15 12. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the feed line (1) and the discharge line (2) for the refrigerant are arranged at different distribution or collection spaces (4a, 4b).
- 20 13. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the feed line (1) and the discharge line (2) for the refrigerant extend along the longitudinal direction of the distribution or collection spaces (4a, 4b) at which they are arranged.
- 25 14. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that the individual heat exchanger units are connected nonpositively, positively and/or cohesively to one another, in particular by a frame device (11).
- 30 15. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that at least the first and/or the
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second flow connection section (23, 23') is twisted over a predetermined angle.

16. The apparatus for heat exchange, in particular as
5 claimed in at least one of the preceding claims, characterized in that the magnitude of the twisting angle is between 10° and 180°, preferably between 45° and 135°, and particularly preferably between 80° and 100°.

10 17. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that at least one of the distribution and collection spaces has receiving devices (31), the
15 internal cross section of the receiving devices (31) substantially corresponding to the external cross section of the throughflow device (7).

18. The apparatus for heat exchange, in particular as
20 claimed in at least one of the preceding claims, characterized in that the receiving devices (31) are substantially rectangular in form, and the longer side of these receiving devices (31) is arranged at a predetermined angle with respect to the longitudinal
25 direction of the distribution and collection spaces (4a, 4b, 5a, 5b).

19. The apparatus for heat exchange, in particular as
30 claimed in at least one of the preceding claims, characterized in that the magnitude of the angle is between 0 degrees and 90 degrees, preferably between 0 degrees and 45 degrees, and particularly preferably between 0 degrees and 10 degrees.

35 20. The apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, characterized in that a plurality of throughflow

devices (7) are arranged substantially parallel to one another.

21. The apparatus for heat exchange, in particular as
5 claimed in at least one of the preceding claims,
characterized in that the throughflow device (7) is
produced from at least one material selected from a
group of materials consisting of metals, in particular
10 aluminum, manganese, silicon, magnesium, iron, brass,
copper, tin, zinc, titanium, chromium, molybdenum,
vanadium, silicon, magnesium and alloys, such as
EN-AW 3003, EN-AW 3102, EN-AW 6060, EN-AW 1110 thereof,
plastics, fiber-reinforced plastics, composite
materials.

15 22. The apparatus for heat exchange, in particular as
claimed in at least one of the preceding claims,
characterized in that more than one, preferably two
heat exchanger units are provided and are thermally
20 separated from one another.

23. The apparatus for heat exchange, in particular as
claimed in at least one of the preceding claims,
characterized in that at least two heat exchanger units
25 are held spaced apart by means of a frame device (11).

24. The apparatus for heat exchange, in particular as
claimed in at least one of the preceding claims,
characterized in that a material which effects thermal
30 separation between the heat exchanger units is arranged
between at least two heat exchanger units, and the heat
exchanger units are cohesively connected to one another
by means of this material.

35 25. An apparatus for exchanging heat, in particular
for motor vehicle air-conditioning systems, having air
flow paths, air flow control elements, at least one air
delivery device and a housing which is suitable for

receiving at least one apparatus for heat exchange, in particular as claimed in at least one of the preceding claims, or within which such an apparatus for heat exchange is arranged.

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26. A device for exchanging heat, in particular for motor vehicle air-conditioning systems, having at least one condenser, a compressor, an expansion valve, a collector and at least one apparatus for heat exchange,
10 in particular as claimed in at least one of the preceding claims.